

Assessing the Extent of ~~Overlap~~ Competition Between Steller Sea Lions and Commercial Fisheries



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PROJECT 2001-76

University of British Columbia

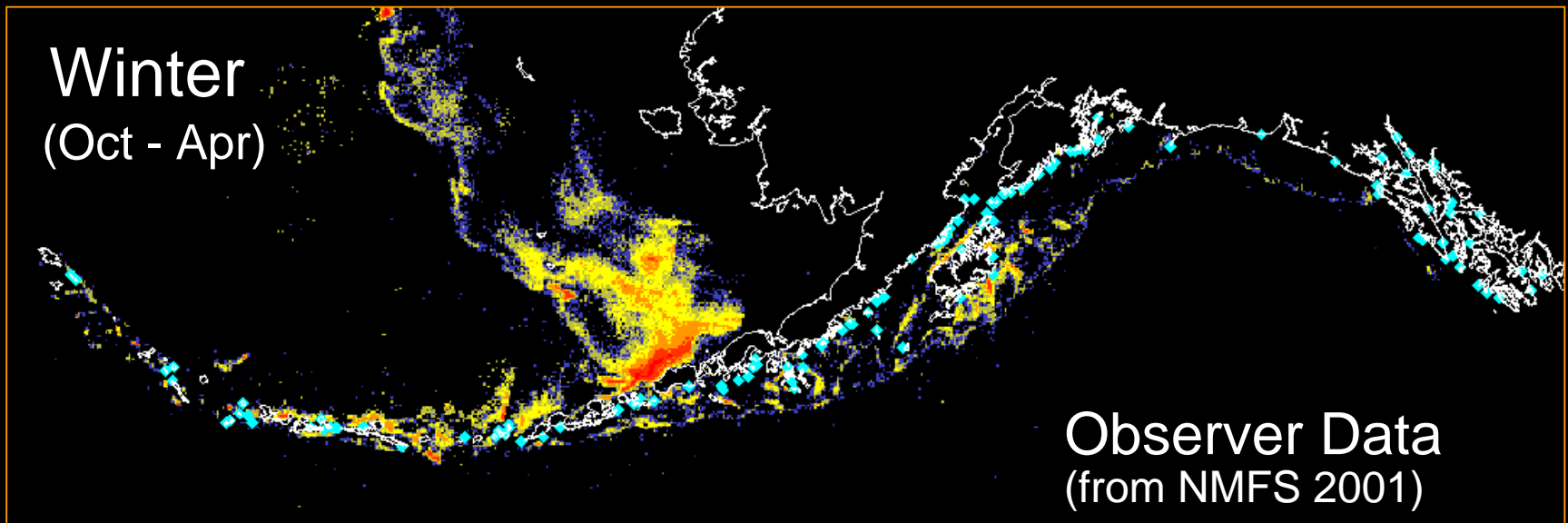
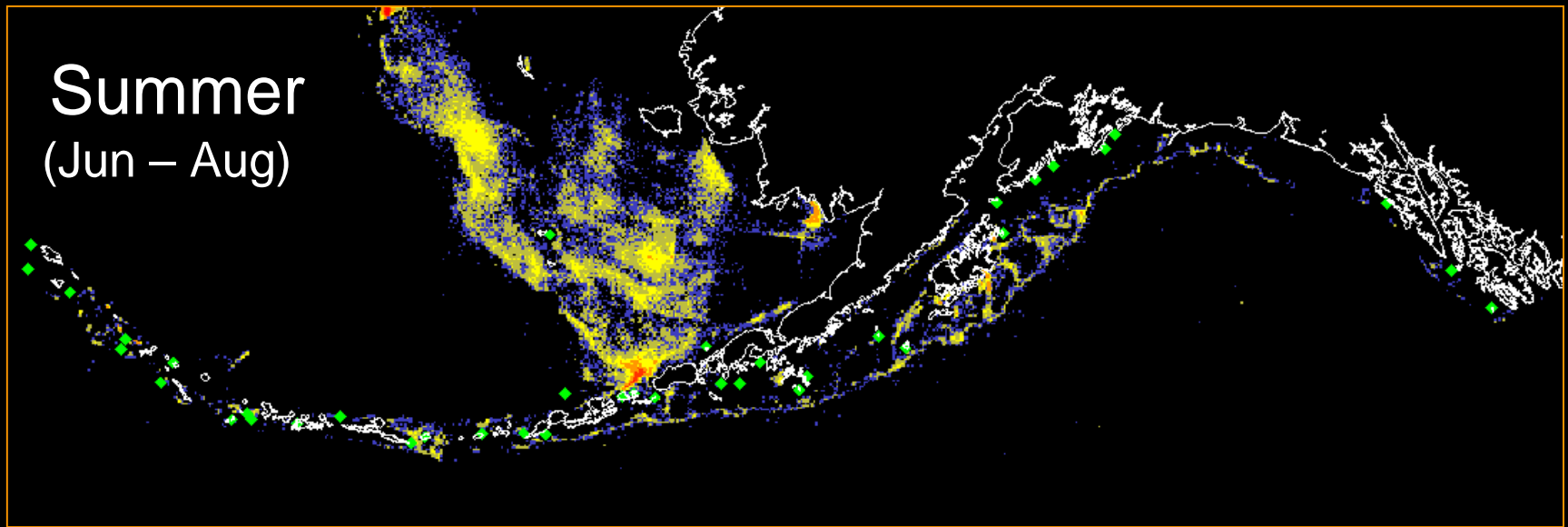
North Pacific Universities Marine Mammal Research Consortium

Commercial Fishing

- Where?
- When?
- How much?



Cumulative Trawl Effort (1973-2000)

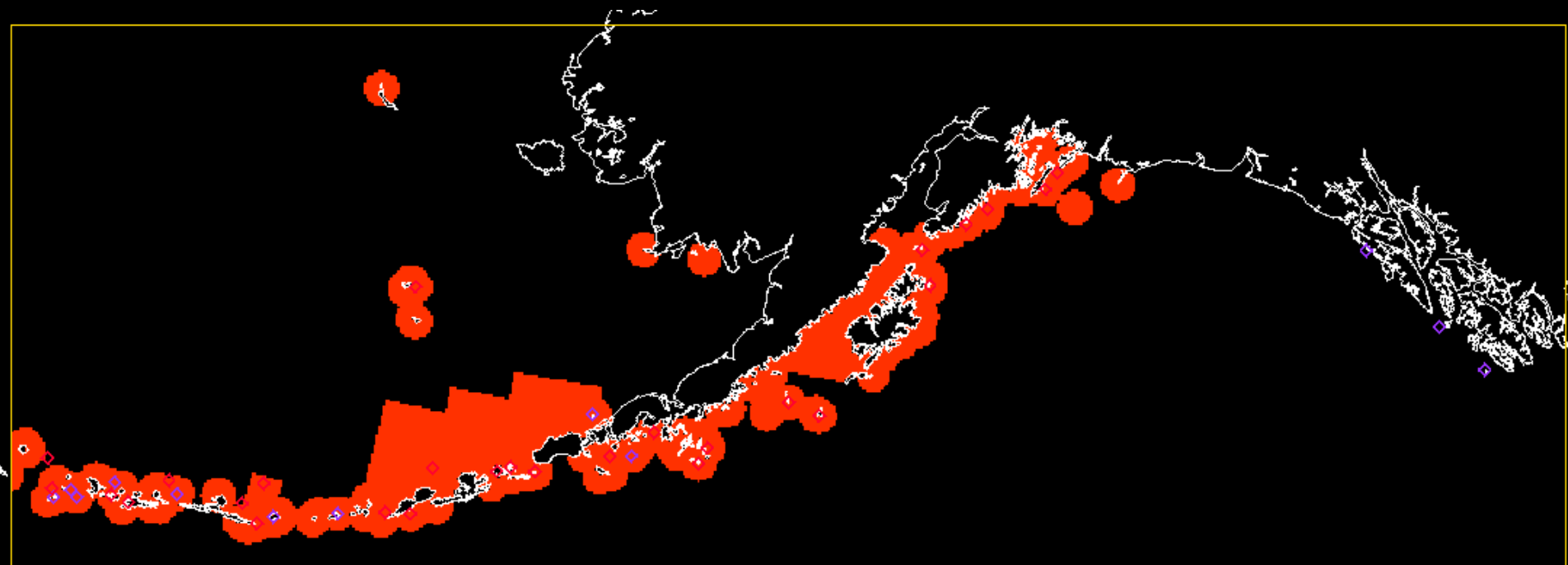


Steller Sea Lions

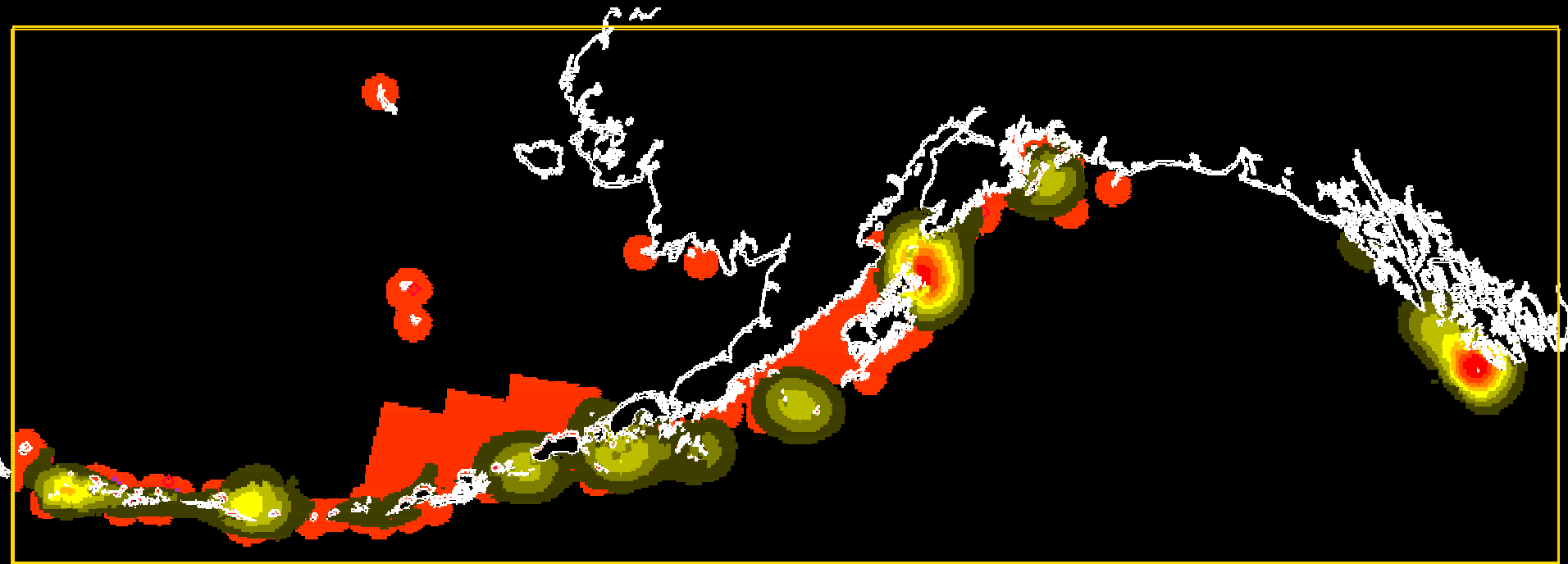
- Where?
- When?
- How much?



NMFS Critical Habitat

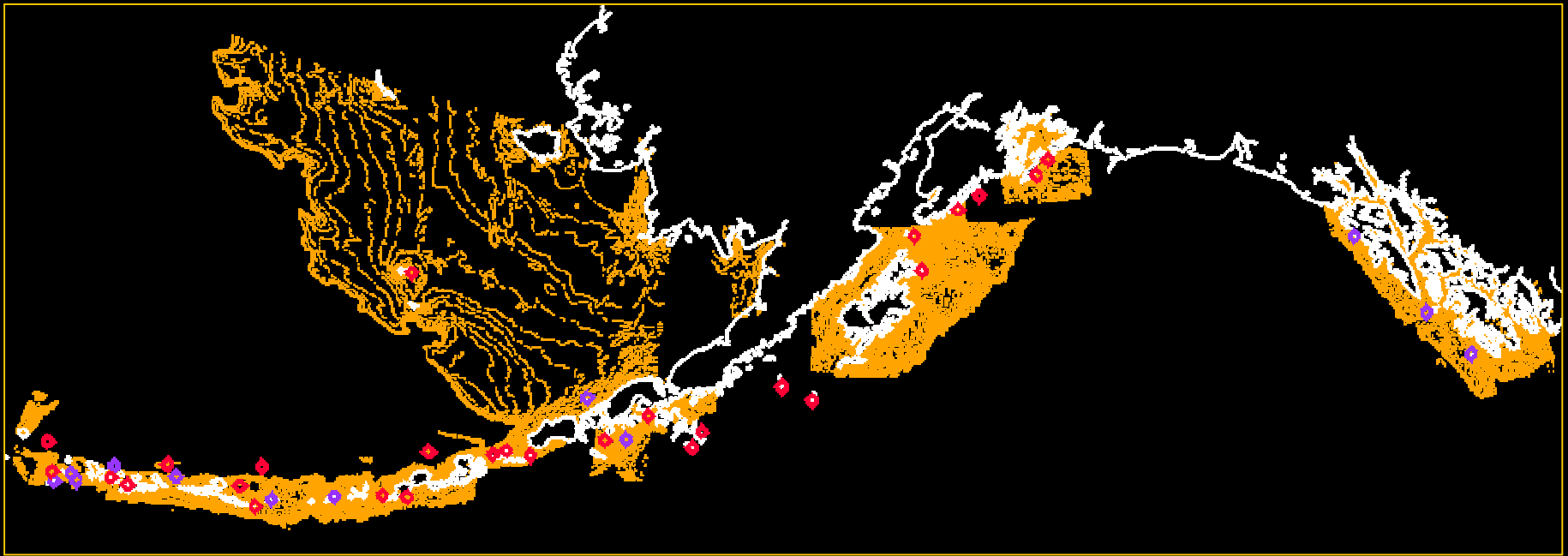


Biological Habitat



Bathymetric Data Layer

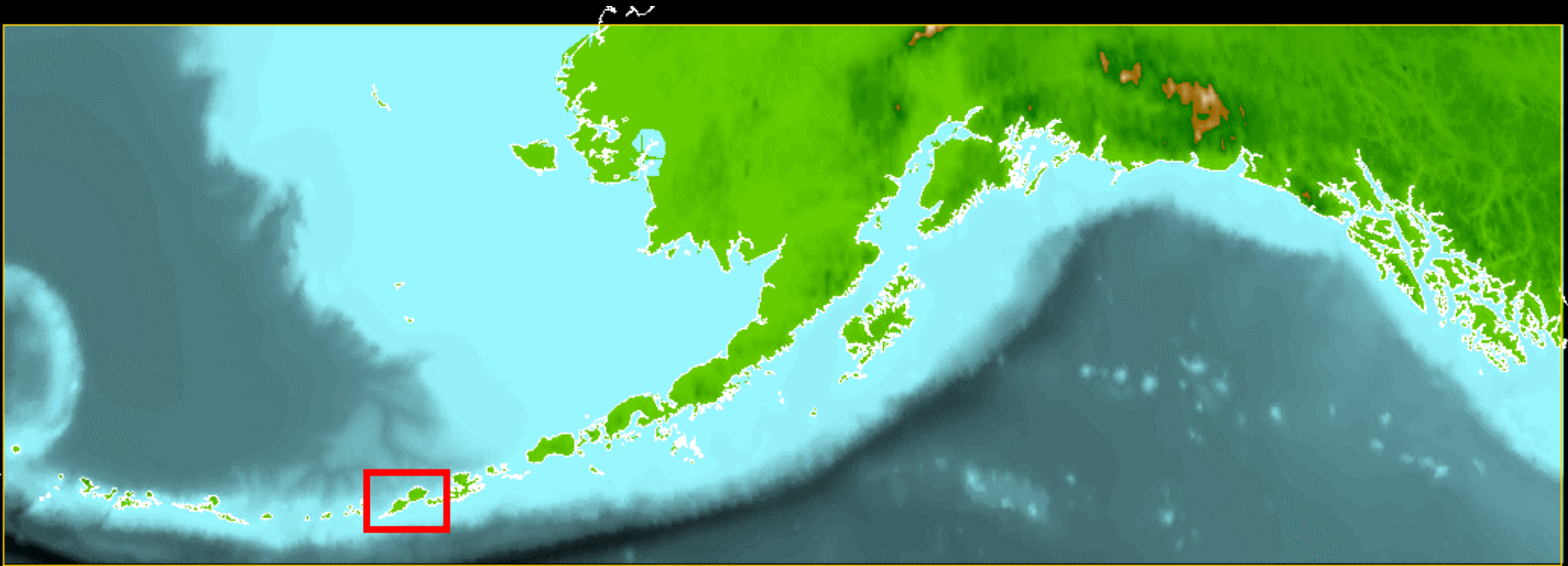
- ETOPO 5 Grid – 5 minute lat.-long resolution
- SciFish bathymetric contours – meter resolution



- Combine data sets into a TIN surface
- interpolate to raster of desired resolution

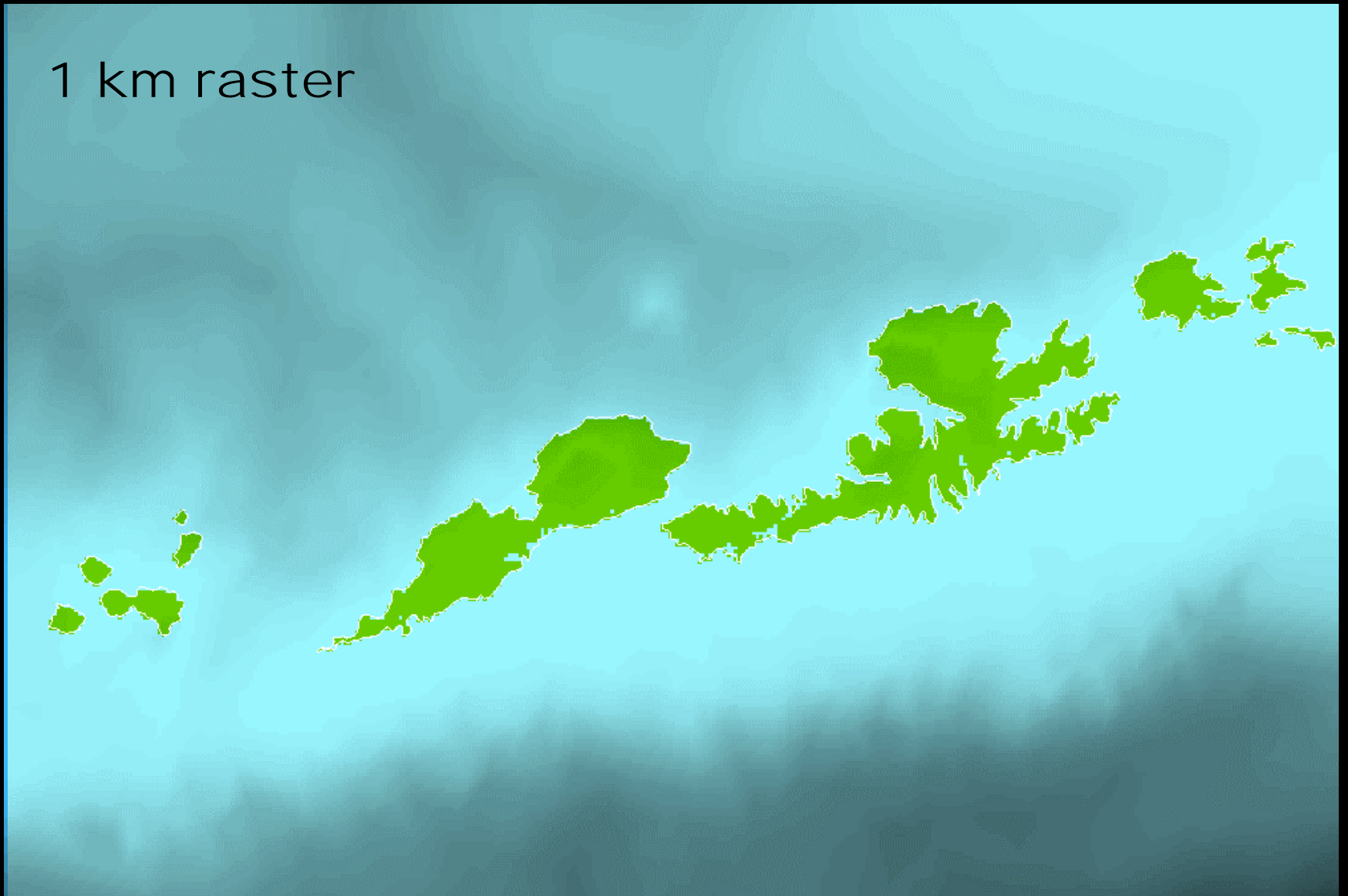
Bathymetric Data Layer

- ETOPO 5 Grid – 5 minute lat.-long resolution
- SciFish bathymetric contours – meter resolution



- Combine data sets into a TIN surface
- interpolate to raster of desired resolution

1 km raster



Population Size (1956-2000)

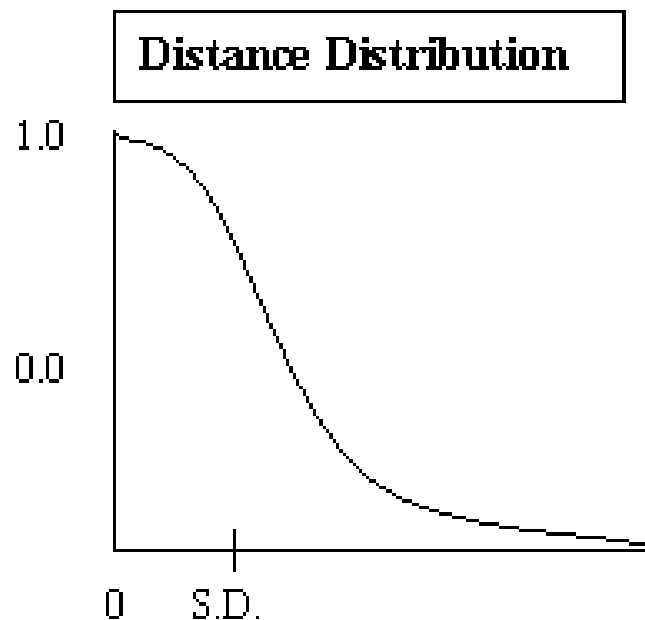


Foraging

- Distance
- Depth



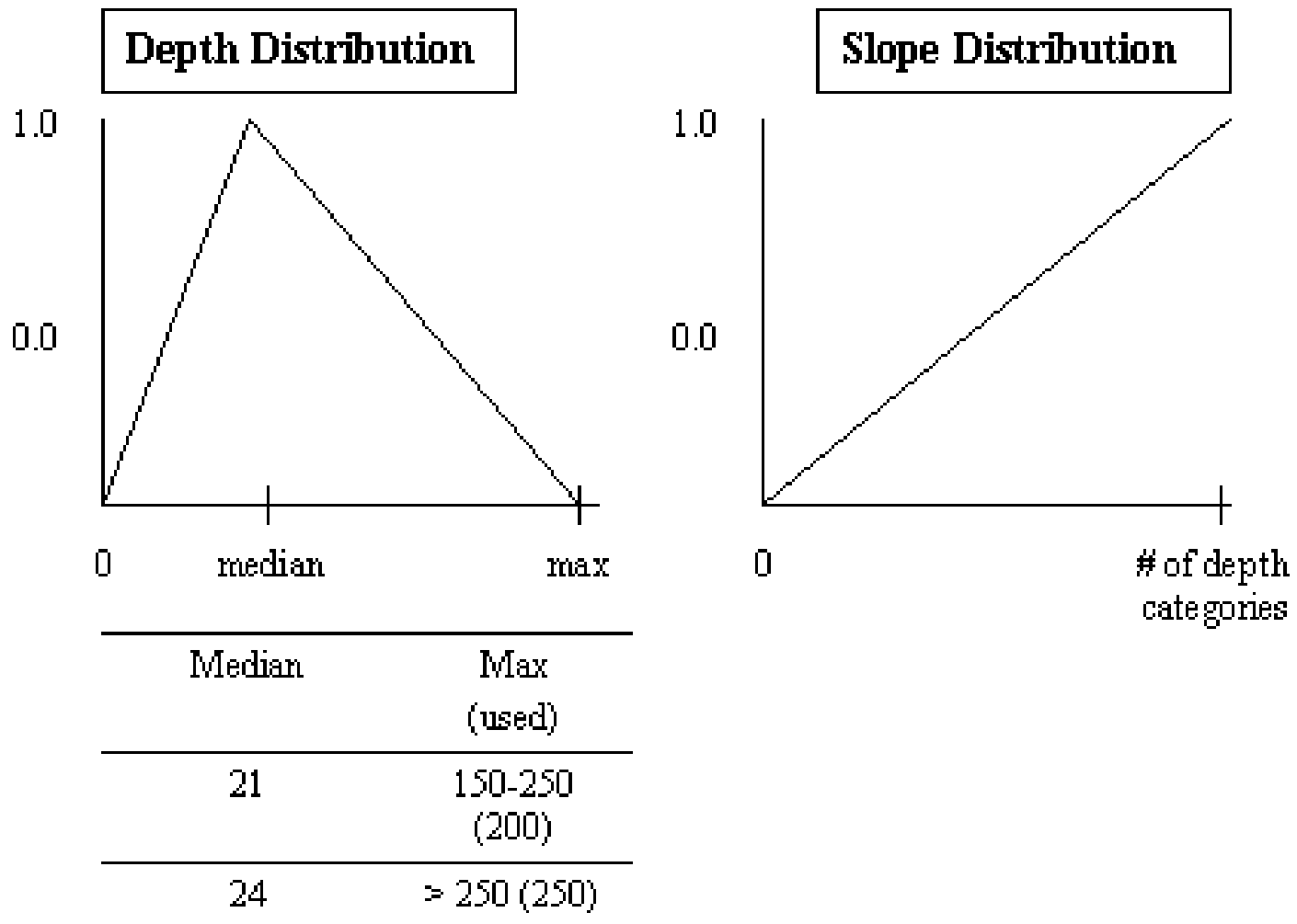
Foraging Parameters



Season	Mean	Std. Dev	S.D. (model)
Summer	17	4.6	31
Winter	133	60	313

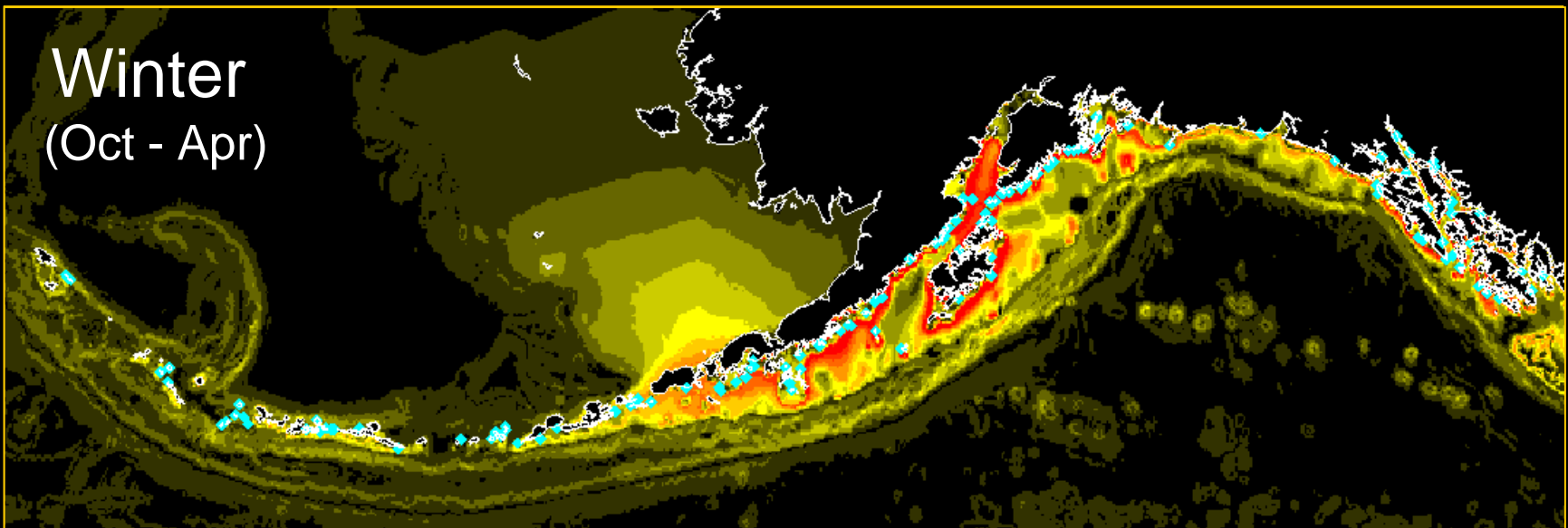
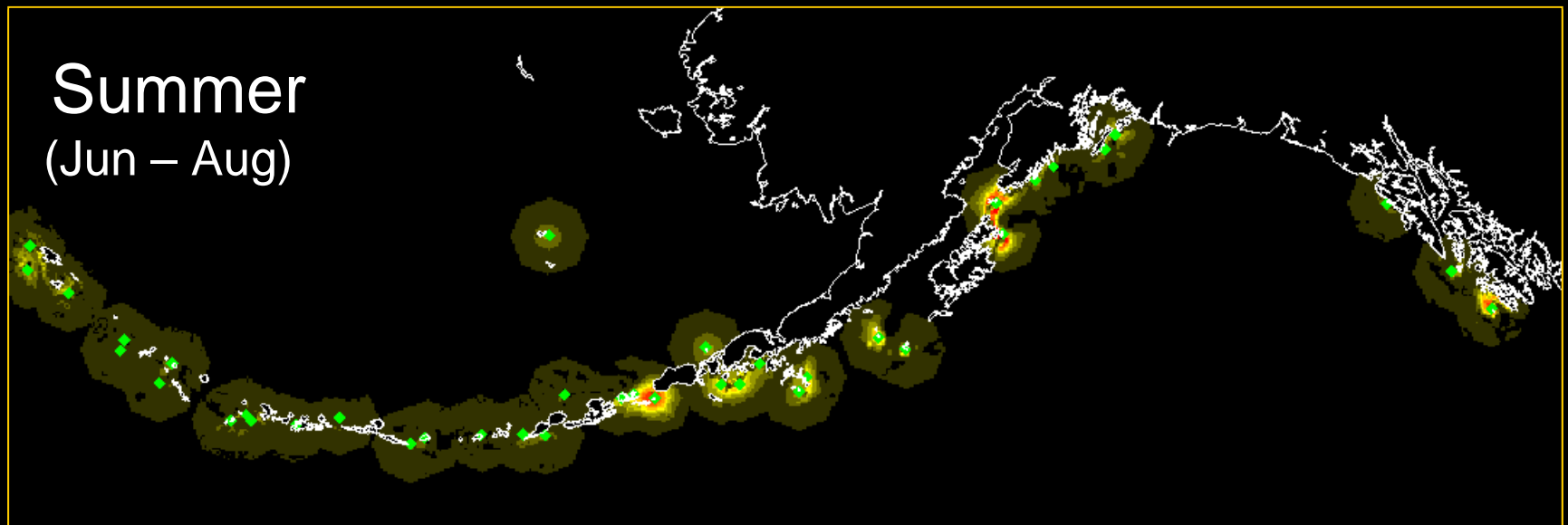
from Merrick and Loughlin (1997)

Foraging Parameters

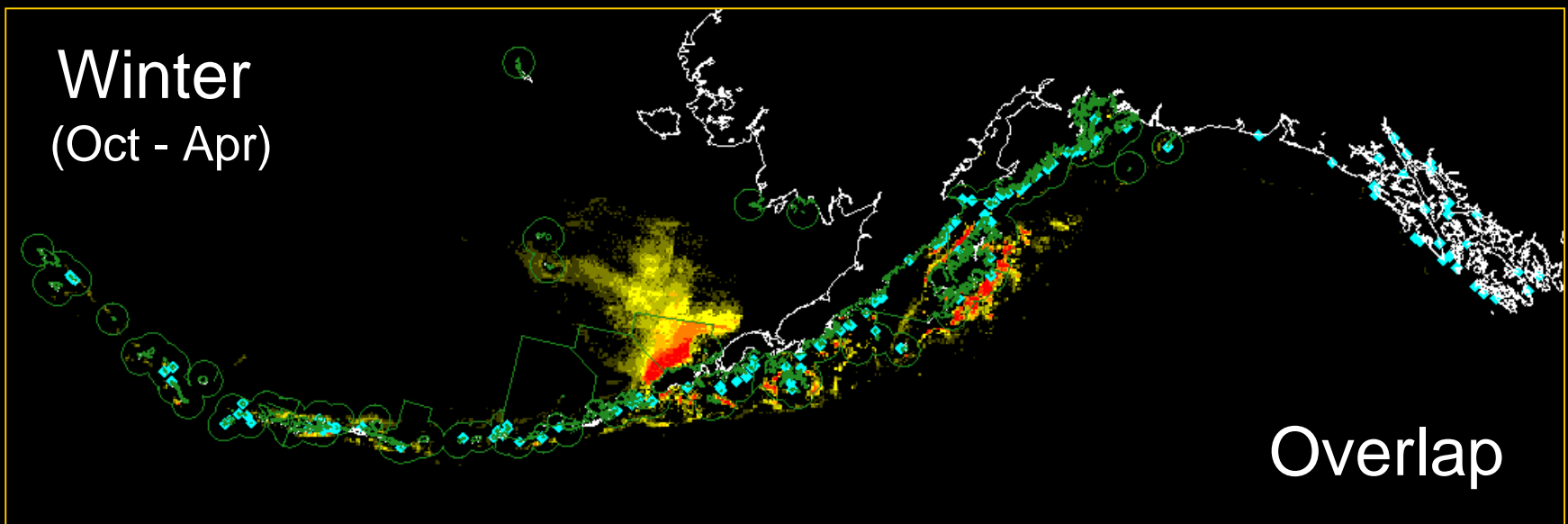
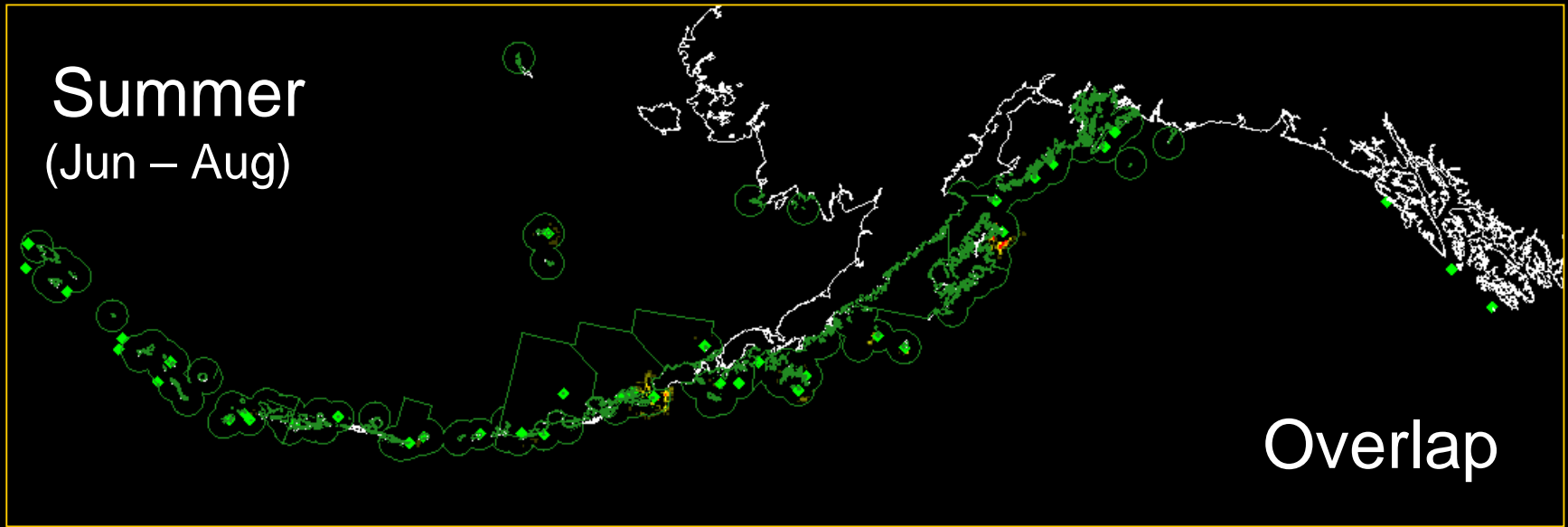


from Merrick and Loughlin (1997)

Population Weighted Distance Model



Fishery & Sea Lion Overlap (joint probability)



Next....

- Refine & validate habitat model
 - foraging locations (from satellite tracking), sea lion by-catch areas (from observer data), fish distributions, and physical oceanography (water currents, temperatures and salinities)
- Estimate niche overlap (competition)
 - incorporate bioenergetics, and fish distribution & abundance
- Explore alternative management actions



Acknowledgements

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